Claims

What is claimed is:

1. A method for determining factors to be used for controlling the reaction of a safety restraint system, said method comprising the steps of:

sampling output signals of a plurality of spaced weight sensors disposed between a seat surface and a seat mounting surface and spaced such that forces applied to a seating surface and a seat back are measured, said output signals indicative of the applied weight to each sensor;

determining a total applied weight to a vehicle seat from the output signals of the weight sensors; and

calculating a center of gravity of the seat occupant for use as an information factor.

2. A method as in claim 1 further comprising the steps of using the center of gravity to determine a correction factor; and

calculating an actual weight of the seat occupant by multiplying the total applied weight by the correction factor.

3. A method as in claim 2 further comprising the step of determining a weight classification of the seat occupant from the actual weight of the seat occupant.

4. A method as in claim 3 further comprising the step of sending the weight classification to the safety restraint system to be used to control the reaction of the safety restraint system.

5. A method as in claim 1 further comprising the step of using the center of gravity to determine the seating position of the seat occupant.

6. A method as in claim 5 further comprising the step of

determining a seating position classification of the seat occupant.

7. A method as in claim 6 further comprising the step of sending the seating position classification to the safety restraint system to be used to control the reaction of the safety restraint system.

8. A method as in claim 5 further comprising the step of sensing a position of the vehicle seat relative to a vehicle dashboard.

9. A method as in claim 8 further comprising the step of combining the seating position of the seat occupant with the position of the vehicle seat to determine a seating position classification of the seat occupant.

10. A method as in claim 9 further comprising the step of sending the seating position classification to the safety restraint system to be used to control the reaction of the safety restraint system.

11. A method as in claim 1 wherein the step of sampling the output signals of the weight sensors includes the step of taking a biasing average of the output signals from the sensor over period a time.

12. A method as in claim 1 wherein the step of sampling the output signals of the weight sensors includes the step of developing a pulse width modulation signal indicative of the applied weight to each sensor.

13. A method as in claim 1 wherein the step of sampling of the output signals of the weight sensors includes the step of compensating for varying temperature.

14. A method as in claim 1 wherein the step of determining the center of gravity includes the steps of: summing the output signals of the sensors located at the first connection point for providing a sum;

dividing the sum by a total of the output signals from the sensors.

15. A method as in claim 1 wherein four weight sensors are disposed between the seat surface and seat mounting surface, two weight sensors located at a first connection point near a front of the seat, where the seat surface and the seat mounting surface connect, and two weight sensors located at a second connection point, near a rear of the seat, where the seat surface, seat mounting surface and a seat back connect.

16. A method as in claim 1 wherein each weight sensor includes at least one strain gage.

17. A method for determining weight of a vehicle occupant to control the reaction of a safety restraint system, comprising the steps of:

sampling output signals of a plurality of spaced weight sensors disposed between a seat surface and a seat mounting surface and spaced such that forces applied to a seating surface and a seat back are measured, said output signals indicative of the applied weight to each sensor;

determining a total applied weight to a vehicle seat using the output signals of the weight sensors;

determining whether the total applied weight is above a predetermined weight to distinguish between a child and an adult seat occupant;

utilizing the applied weight as an actual weight when the applied weight is not above the predetermined weight; and

calculating the actual weight of the seat occupant by multiplying the total applied weight by a correction factor for a normal seating position when the applied weight is above the predetermined weight.

18. A method as in claim 17 further comprising the step of determining a weight classification of the seat occupant.

19. A method as in claim 18 further comprising the step of sending the weight classification information to the safety restraint system to be used to control the reaction of the safety restraint system.

20. A system for providing factors to be used for controlling the reaction of a vehicle safety restraint system comprising:

a plurality of spaced weight sensors disposed between a seat surface and a seat mounting surface for providing output signals indicative of an applied weight to each sensor and spaced such that forces applied to a seating surface and a seat back are measured;

each said weight sensor including a seat surface engaging portion, a seat mounting surface engaging portion and a walled portion extending between said engaging portions;

each said walled portion including at least one strain gage mounted thereon for measuring wall deflection, and providing a strain gage output signal indicative of the applied weight; and

a controller in communication with the weight sensors and the safety restraint system for calculating an information factor, in response to the output signals of the weight sensors, to be used to control the reaction of the vehicle safety restraint system.

21. A system as in claim 20 wherein the information factor is a seating position of the seat occupant.

22. A system as in claim 20 wherein the information factor is a weight of the seat occupant.

23. A system as in claim 20 wherein each sensor includes a sensor interface circuit comprising:

an amplifier circuit for amplifying the strain gage output signal; and

a pulse width modulation circuit for providing a pulse width modulation signal indicative of the applied weight to the sensor to be applied to the controller.

24. A system as in claim 23 further comprising a temperature control circuit for compensating for varying temperatures within the sensor interface circuit.

25. A system as in claim 23 wherein the amplifier circuit comprises a first operational amplifier and a second operational amplifier.

26. A system as in claim 23 wherein the pulse width modulation circuit comprises:

a voltage reference circuit for providing a constant voltage to an integrator;

said integrator providing a reference signal to be compared with the strain gage output signal; and

a comparator for comparing the reference signal and the strain gage output signal to generate the pulse width modulation signal indicative of the applied weight to the sensor.

27. A system as in claim 26 wherein the integrator has a reset control circuit for restarting the reference signal when said reference signal reaches a predetermined voltage level.

28. A system as in claim 20 wherein the sensors are located at a first connection point near a front of the seating surface where the seating surface and the seat mounting surface connect and at a second connection point near a rear of the seating surface where the seating surface, seat mounting surface and a seat back connect.

29. A system as in claim 28 wherein four sensors are disposed

between the seat and seat mounting surface, two sensors located at the first connection point and two sensors located at the second connection point.

30. A system as in claim 20 wherein each sensor includes four strain gages, two strain gages mounted on an inner diameter of the walled portion and two strain gages mounted on an outer diameter of the walled portion.

31. A system as in claim 30 wherein the two strain gages on the inner diameter are diametrically opposite and the two strain gages on the outer diameter are diametrically opposite.

32. A system as in claim 20 further comprising a position sensor mounted within seat tracks defining said seat mounting surface to determine the position of the seat relative to a vehicle dashboard.

33. An apparatus for controlling a vehicle safety restraint system, comprising:

a plurality of weight sensors disposed between a seat surface and a seat mounting surface, each said weight sensor engaging a respective seat surface and a respective seat mounting surface, each said weight sensor providing a strain gage output; and

a controller operatively connected to a safety restraint device and said plurality of weight sensors, said controller determining an information factor in response to said strain gage output, and controlling the safety restraint device in response to said information factor.

34. The apparatus as in claim 33, wherein said information factor comprises center of gravity and occupant weight information.

35. The apparatus as in claim 34, wherein said information factor comprises occupant position information.